UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to:
2003/00839

October 29, 2003

Mr. Fred Patron
U.S. Department of Transportation
Federal Highway Administration
The Equitable Center, Suite 100
530 Center Street NE
Salem, OR 97301

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation on the Effects of the North Jefferson Interchange - North Albany Interchange Southbound Road Improvement Project, Willamette and Santiam Rivers, Marion and Linn Counties, Oregon

Dear Mr. Patron:

Enclosed is a biological opinion (Opinion) pursuant to section 7 of the Endangered Species Act (ESA) prepared by the National Marine Fisheries Service (NOAA Fisheries), on the effects of funding the proposed North Jefferson Interchange - North Albany Interchange Southbound Road Improvement Project, in Marion and Linn Counties, Oregon. In this Opinion, NOAA Fisheries concludes that the proposed action is not likely to jeopardize the continued existence of ESA-listed Upper Willamette River (UWR) chinook salmon (*Oncorhynchus tshawytscha*)and UWR steelhead (*O. mykiss*). As required by section 7 of the ESA, NOAA Fisheries includes reasonable and prudent measures with non-discretionary terms and conditions that NOAA Fisheries believes are necessary to minimize the impact of incidental take associated with this action.

This document also serves as consultation on essential fish habitat pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and its implementing regulations at 50 CFR Part 600.

If you have any questions regarding this consultation, please contact Tom Loynes of my staff in the Oregon Habitat Branch at 503.231.6892.

Sincerely,

For Michael R Crouse

D. Robert Lohn
Regional Administrator

cc: Molly Cary, ODOT
Nick Testa, ODOT
Brian Bauman, ODOT
Randy Reeve, ODFW
Stuart Myers, Mason, Bruce and Girard, Inc.

Endangered Species Act - Section 7 Consultation
Biological Opinion

&

Magnuson-Stevens Fishery Conservation and Management Act
Essential Fish Habitat Consultation

North Jefferson Interchange - North Albany Interchange
Southbound Road Improvement Project,
Willamette and Santiam Rivers,
Marion and Linn Counties, Oregon

Agency:	Federal Highway Administration
Consultation Conducted By:	NOAA's National Marine Fisheries Service, Northwest Region
Date Issued:	October 29, 2003
Issued by:	for Michael R Crouse D. Robert Lohn Regional Administrator
Refer to:	**2003/00839**

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Consultation History

On June 27, 2003, NOAA's National Marine Fisheries Service (NOAA Fisheries) received a request from the Federal Highway Administration (FHWA) for Endangered Species Act (ESA) section 7 formal consultation and essential fish habitat (EFH) consultation under the Magnuson-Stevens Fishery Management and Conservation Act (MSA) on the effects of funding the North Jefferson Interchange - North Albany Interchange Southbound Road Improvement Project, Marion County and Linn County, Oregon. In the accompanying biological assessment (BA), the FHWA determined that Upper Willamette River (UWR) chinook (*Oncorhynchus tshawytscha*) and UWR steelhead are likely to be adversely affected (LAA) by the proposed project.

This biological opinion (Opinion) is based on the information presented in the BA, site visits, and discussions with, FHWA, Oregon Department of Transportation (ODOT), and project consulting firm Mason, Bruce and Girard. The Opinion considers the potential effects of the proposed action on UWR chinook and UWR steelhead. UWR chinook were listed as threatened on March 24, 1999 (64 FR 14308) and protective regulations issued on July 10, 2000 (65 FR 42422). Additional references and biological information are available in Myers *et al.*1998 and Healey 1991. UWR steelhead were listed as threatened under the ESA by NOAA Fisheries on March 25, 1999 (64 FR 14517). Protective regulations for UWR steelhead were issued under section 4(d) of the ESA on July 10, 2000 (65 FR 42422). This consultation is conducted pursuant to section 7(a)(2) of the ESA and its implementing regulations, 50 CFR 402 and for MSA section 305 (b).

1.2 Proposed Action

The purpose of the proposed action is to improve existing road conditions for vehicular traffic along the southbound lanes of Interstate 5 (I-5) within the project site by resurfacing the roadway, replacing seven freeway bridges, and constructing three additional bridges along the proposed frontage road alignment. The existing I-5 bridges were built in the 1950s and their reinforced concrete deck girders are exhibiting shear cracks and other signs of deterioration, and the pavement on this section of I-5 is nearing the end of its design life. The proposed project is the second phase of the North Jefferson Interchange - North Albany Interchange project. The first phase addressed the northbound lanes within the project limits.

The project site includes the southbound lanes of I-5 between the North Albany interchange and the North Jefferson interchange, milepoint (MP) 234.74 to 244.69. Regionally, I-5 is the main northbound and southbound linkage for the Willamette Valley, serving as Oregon's main thoroughfare for the transport of goods and passenger traffic.

The action area for this project is the project limits, a segment of I-5 southbound which is approximately 16.1 kilometers (km) long, extends from MP 234.74 to 244.69, and a 100-meter (m) buffer around the project footprint, which includes 100 m outside the project footprint on streams and ditches that have ESA-listed fish. The action area also includes a 200-m section of the Sidney Power Ditch (Sidney Ditch), and Miller and Chehulpum Creeks 100 m downstream of in-water work areas. This area has been determined based on potential habitat and water quality impacts that may occur downstream of the project site as a result of the proposed action.

Construction of the proposed project will be limited to the southbound lanes of the freeway within the project limits. The existing bridges within the project area will be removed concurrently with freeway resurfacing preparation. After the freeway surface has been ground and the existing bridges removed, the new shoulders and wider bridge approaches will be constructed. In addition, proposed ramp improvements will occur during construction of the new shoulders and bridge approaches. After the bridge approaches and shoulders are constructed, re-paving of the southbound travel lanes will begin concurrently with bridge construction. After traffic is moved back onto the southbound travel lanes, the majority of the detour will be removed. Construction of the proposed frontage road including three new bridges will also occur concurrently with the I-5 bridge replacements and will be completed after the traffic is back on southbound traffic lanes.

The typical section for the proposed roadway will consist of two 3.6-m travel lanes with 1.8-m wide shoulders. The shoulder slopes will be fairly flat ranging from 1:4 to 1:6 vertical to horizontal.

After traffic has been routed to the detour lanes, the southbound travel lanes will be ground to the existing reinforced concrete under the roadway surface. Some vegetation removal, consisting of native and exotic grasses and forbs, will occur along the roadway corridors. Some tree removal will be required as a result of shoulder extension, however, it will be primarily the vegetation described above. Other vegetation removal will occur at the pond adjacent to the South Jefferson Interchange, Sidney Ditch, Chehulpum Creek, Santiam overflow 7 and Santiam overflow 1 bridge locations, and along the proposed frontage road alignment.

The vegetation proposed for removal from the riparian area of the pond located adjacent to the South Jefferson Interchange consists of black cottonwood (*Populus balsamfera*), vine maple (*Acer circinatum*) willow (*Salix spp*.), and Douglas-fir (*Pseudotsuga menziesii*). Maintenance of the freeway and its associated bridges has created an existing vegetative condition that primarily consists of native and non-native grasses, forbs, and shrubs. Construction of the proposed frontage road consist of Himalayan blackberry (*Rubus discolor*), Douglas-fir, bigleaf maple (*Acer macrophyllum*), Oregon white oak (*Quercus garryana*), black cottonwood, and vine maple removal. All permanent riparian impacts will be mitigated at a 1.5:1 replacement ratio.

1.2.1 Construction Detour

Southbound traffic will be shifted onto the existing detour that was constructed for northbound freeway improvements. A small portion of the detour will be constructed to shift southbound traffic onto the detour near the North Jefferson Interchange and shifted back to the existing southbound lanes at the North Albany Interchange. With the exception of a 1.2-m wide center portion, the surface of the detour will be removed after completion of this project. This detour was an existing road parallel with the highway lanes. Removal of the detour surface will reduce the existing impervious surface within the action area by 6.1 ha. Only the base rock will remain. The base rock is clean at the soil level and should provide a good medium to vegetate. Two vegetated roadside ditches will be created in this base rock to collect stormwater runoff from portions of the southbound and northbound lanes. The existing drain inlets will focus to the new ditch line to receive drainage from the existing cross culverts in the roadway.

1.2.2 Stormwater Treatment

Because the proposed project primarily involves shoulder widening and roadway resurfacing, drainage design will largely involve extending existing drainage pipes and moving vegetated ditches beside the freeway's southbound lanes. Some of the existing ditches will be moved slightly westward to accommodate shoulder widening and roadway resurfacing but their flow paths will not change. The existing drainage pipes drain the median and ditches. The proposed spanning bridges will be curbed to route water from the bridge decks to the ends and not directly into adjacent waterbodies. The runoff will sheet flow into the vegetated ditches. Stormwater runoff associated with the proposed frontage road will be effectively treated by directing the runoff to water quality treatment facilities in the form of vegetated ditches. This determination is based on the road's anticipated low average daily traffic (ADT), current site conditions that promote water infiltration into relatively level pervious terrain, and the absence of any stream system near the frontage road. A vegetated ditch will be constructed on the west side of the proposed frontage road to collect and treat stormwater runoff originating from the roadway. In addition, two vegetated ditches beside the existing detour lanes will remain to provide stormwater treatment along the freeway.

All of the vegetated ditches will be designed with 3:1 slopes and will be seeded with a mix of plant species conducive to erosion control and biochemical processing of nutrients. The ditches will be designed to detain, treat, and infiltrate stormwater onsite without causing flooding or erosion. The proposed treatment facilities have been designed to conform to the existing site conditions and the quantity of impervious surface within the action area to remove debris, nutrients, sediments, and other pollutants present in the stormwater runoff.

Drainage will be accomplished by the construction of a new box culvert at the proposed realigned southbound off-ramp at the South Jefferson Interchange. An existing concrete culvert routes drainage from the east side of the freeway to the west side of the southbound off-ramp at the interchange where infiltration occurs via a long channelized ditch and into the vegetation. A new box culvert was constructed on the northbound on-ramp at the intersection.

1.2.3 Bridge/Culvert Work

Overflow Bridges

There are a total of 10 locations (seven to the south of the Santiam River/I-5 crossing and 3 to the south of the crossing with two bridge structures per location) within the project corridor where overflow channels of the Santiam River intersect I-5.

All but two of the channels spanned by the existing overflow channel structures are dry throughout the year. Two overflow channel crossings retain ponded water during portions of the year (*i.e.* Santiam Overflow 1, Santiam Overflow 6 frontage road, and Santiam Overflow 7). The proposed overflow bridges are multi-span structures varying in length.

Santiam River overflows receive water only during extreme flood events. Therefore, the I-5 Santiam River overflow crossing locations are predominantly dry with no consistent hydrologic connectivity to the Santiam River. ODOT (1990) determined that a flood event with a recurrence interval of 150 years would flood at the overflow locations. Unless a flood event occurs, there will be no need for dewatering at these locations.

Bank armoring at some of the overflow bridge replacement locations will provide required flood scour protection. Approximately 1,380 m^3 of riprap will be used for bridge substructure protection. Riprap will be used at all of the bridge replacement locations except for the bridges spanning Santiam Overflows 1 and 10 at the freeway and the proposed new bridge at Santiam Overflow 10 along the proposed frontage road crossing.

Santiam Overflow Number 1

Santiam Overflow Number 1 is located approximately 2 km north of the I-5 Santiam River crossing. The proposed bridge for this crossing is a cast-in-place (CIP) reinforced concrete slab superstructure and pile pipe substructure. The bridge will be 16 m wide and 36 m long, with three 12-m spans to match the footprint of the northbound structure and minimize obstructions for passage of debris. Riprap will not be used at this location.

Santiam Overflow Number 5

Santiam Overflow Number 5 is approximately 1.3 km south of the I-5 Santiam River crossing. The proposed bridge for this crossing is a CIP reinforced concrete slab superstructure supported by 40.5 cm pile pipe. The three-span bridge will be 13.5 m wide and 35 m long. Approximately 120 m^3 of riprap will be placed at the base of the bridge's substructure and toe trench excavation.

Santiam Overflow Number 5 (Frontage Road)

The bridge spanning Santiam Overflow Number 5 at the proposed frontage road will be located approximately 30.5 m southwest of the freeway. The proposed bridge for this crossing is a CIP reinforced concrete slab superstructure supported by 40.5 cm pile pipe. The three-span bridge will be 9 m wide and 40 m long. Approximately 900 m^3 of riprap will be placed at the base of the bridge's substructure and toe trench excavation.

Santiam Overflow Number 6

Santiam Overflow Number 6 is approximately 2 km south of the I-5 Santiam River crossing. Due to preliminary geotechnical investigations, the span length for this bridge is limited to a maximum of 16 m. The proposed bridge will consist of an eight-span, CIP concrete haunched slab deck with expansion joints at the abutments supported by concrete pile caps on pipe piles. The bridge will be 92 m long and 17 m wide. Approximately 270 m^3 of riprap will be placed at the base of the bridge's substructure and toe trench excavation.

Santiam Overflow Number 6 (Frontage Road)

The bridge spanning Santiam Overflow Number 6 at the proposed frontage road will be approximately 36.5 m west of the freeway. Because the road at this location is at a slight skew to the channel, the bridge will also require a similar skew. Due to the curvature, the proposed bridge consists of a 10-span, CIP concrete haunched slab deck with expansion joints at the abutments supported by concrete pile caps on pipe piles. The bridge will be 120 m long and 9 m wide. Riprap will not be used at this location.

Santiam Overflow Number 7

Santiam Overflow Number 7 is approximately 2.7 km south of the I-5 Santiam River crossing. The proposed bridge at this location consists of a five-span, CIP concrete haunched slab deck with expansion joints at the abutments supported by concrete pile caps on pipe piles. The bridge will be 60 m long and 13.5 m wide. Approximately 960 m^3 of riprap will be placed at the base of the bridge's substructure and toe trench excavation.

Santiam Overflow Number 10

Santiam Overflow Number 10 is approximately 1.6 km south of the I-5 Santiam River crossing. The proposed bridge is a three-span structure with a CIP reinforced concrete slab superstructure supported by 40.5 cm pipe pile. The bridge will be 35 m long and 13.5 m wide. No riprap will be required for the proposed structure at this location and less than 40 m^3 of excavation will be required.

Santiam Overflow Number 10 Frontage Road

The bridge spanning Santiam Overflow Number 10 at the proposed frontage road will be approximately 10.5 m west of the freeway, beside the Santiam Overflow bridge on the highway. The proposed bridge is a three-span structure with a CIP reinforced concrete slab superstructure supported by 40.5 cm pipe pile. The bridge will be 35 m long and 9 m wide. The proposed bridge will be aligned and designed similar to the existing bridge at this location that carries the southbound on-ramp for the Hoofer Drive Interchange. No riprap will be required for the proposed structure at this location and less than 40 m^3 of excavation will be required.

Irrigation Ditch/Creek Bridges

The proposed project also includes the replacement of two bridges spanning irrigation ditches (Sidney Ditch and Chehulpum Creek). Chehulpum Creek is a tributary to the Sidney power ditch. These bridges are the only structures that span areas that could potentially contain federally-listed salmonids. Proposed bridges at irrigation ditch crossings will be single-span structures ranging from 14 m to 15.2 m in length.

Sidney Ditch

The I-5 crossing of the Sidney Ditch is located at MP 242.38. The proposed replacement bridge will be a single span structure that is 14 m wide and 14 m long. Placement of permanent structures within the ordinary high water elevation (OHWE) will not occur, however placement of riprap and removal of existing structures will occur. Dewatering and fish salvage will need to occur to minimize impacts to listed fish and their habitat. Approximately 220 m^3 of riprap will be placed at the base of the bridge's substructure and toe trench excavation.

Chehulpum Creek

The I-5 crossing of the Chehulpum Creek is located at MP 242.14. The proposed replacement bridge is a single-span structure, 14 m wide and 15 m long. Placement of permanent structures within the OHWE will not occur, however placement of riprap and removal of existing structures will occur. Dewatering and fish salvage will need to occur to minimize impacts to listed fish and their habitat. Approximately 125 m^3 of riprap will be placed at the base of the structure's end bents to provide scour protection and toe trench.

Equipment Pass Bridge

An existing bridge at MP 244.03 used to pass farm equipment under I-5, via a small unpaved single-lane road that will be widened as part of the proposed project. ODOT has determined the existing shoulder on the bridge to be substandard and that the bridge should be widened to match the proposed shoulder width of the freeway. The construction will not take place within or near any environmentally-sensitive areas.

Bridge Installation/Removal

The proposed bridges will be constructed after the existing bridges have been removed, the freeway surface has been ground, the bridge approaches have been installed, and fish salvage and dewatering have occurred.

The Santiam Overflow 1, Santiam Overflow 7, Chehulpum Creek, and Sidney Ditch bridges will require temporary work bridges during construction. The temporary bridge will be used for access to the work site and movement of construction equipment. The single lane structures will be next to their respective bridge replacement locations. The bridges will completely span the streams and be made of timber beams and planking suitable for the contractor to pass equipment across the waterbodies and will not be used for public traffic. Some minor excavation may be required (approximately 20 m^3) to install the temporary work bridges, however, the sites will be restored upon completion of bridge construction. Vegetation removal as a result of the installation and use of the temporary bridges will be negligible, given existing site conditions and the proposed location of the temporary bridges.

An approved containment system will be installed below the bridges to prevent materials and debris from entering waterways or restricted work areas. Removal of the structures will be conducted in a manner that will not result in any detrimental damage to the debris containment system and its intended function. A Bridge Removal and Construction Plan (BRCP) will be developed by the contractor via specification to provide details for the bridge removal and construction process for the Sidney Ditch and Chehulpum Creek bridges. The BRCP will outline specific containment measures necessary to keep all bridge removal and construction debris out of the channels and OHWE during the life of the construction contract. A diagram will be prepared to show the method and sequence of construction and removal at both sites and will be submitted as part of the BRCP.

All bridge removal activities will be performed from the existing roadway and/or the temporary work bridges. The frames and decks of the existing bridges will not be removed in a manner that results in splintering, crushing, or breaking of the bridge structure in whole or in part and will be removed in one piece if possible. Any holes left from pile removal will be backfilled.

After the bridge approaches are constructed, the untreated steel pipe piles for the bridge piers will be driven and concrete pile caps will be poured and cured. The CIP bridge decks will be cured in place on the piles. The last stage of bridge installation will be the paving of the bridges' roadway surfaces.

Culvert Extension

Seventeen culverts along the project corridor will be extended as a result of proposed shoulder widening. Fifteen of the culverts transport stormwater collected in the highway's median or in ditches that span the project site. Two culverts take drainage from agricultural fields and form a tributary of Miller Creek under I-5 at MP 244.22. Miller Creek has experienced significant channel alteration, adjacent wetland drainage, and vegetation clearing that have changed the creek's physical and biological structure. The existing culverts at this location have approximately a 1% slope and fish passage is questionable due to their excessive length, approximately 71 m.

The culverts at Miller Creek are made of pre-cast concrete and a special collar will be constructed of steel or concrete and will be fastened to the existing culvert outlets. Culvert extension work will be completed during the in-water work period of June 1 to September 30, for tributaries of the Willamette River's east bank (ODFW 2000), when the stream channels are expected to be dry.

Extension of the culvert conveying the agricultural ditch will require implementation of a temporary water management plan (TWMP). Summer flows in the ditch are typically very low or non-existent, therefore a TWMP may not be necessary if the channel is dry. If flowing water is present, lined sandbag dams will be placed upstream of the culverts to impound and divert all of the stream flow through an adjacent culvert leaving the other culvert dry.

Pumping may be required to de-water the immediate work area, however, if required, it will be for a short duration during the initial work area isolation phase. The pump system will be fitted with screens to exclude fish. All in-water work involving pumping water out of the work area will be conducted according to NOAA Fisheries' Fish Screen Criteria (NOAA Fisheries 1995). Migration will be blocked during water diversion activities, but will not be an issue due to the timing of construction activities and lack of existing passage at the site. At no point during the construction process will the stream be de-watered below the project site.

Fish salvage may need to be conducted following work area isolation if listed species are suspected within the work area. The fish salvage operation will be conducted according to NOAA Fisheries electrofishing guidelines (NOAA Fisheries 2000).

1.2.4 Work Area Isolation/Fish Salvage

The proposed project will require work above the OHWE of the Sidney Ditch and Chehulpum Creek and below the OHWE of Miller Creek. Sidney Ditch and Chehulpum Creek are significantly altered systems used for agricultural and hydroelectric purposes, and they allow fish access due to an unscreened diversion on the Santiam River.

The proposed work areas will need to be isolated and dewatered to reduce potential impacts to downstream habitat and reduce the potential of direct impacts to fish. A temporary water management plan (TWMP) will be developed by ODOT Geo-Hydro staff to ensure that best management practices (BMPs) are incorporated to minimize and avoid impacts to listed species and their habitat.

The bridge replacement work on Sidney Ditch and Chehulpum Creek will require approximately five days of work area isolation for the removal of existing instream structures, and the culvert extension work on Miller Creek will require approximately 1 to 2 days of work area isolation. Fish salvage and removal operations will occur within the in-water work period of June 1 to September 30 (ODFW 2000). All work area isolation plans will be approved by ODOT Geo-Hydro staff before initiation.

Fish passage will be blocked in the work area via block nets. Once the nets are in place, fish salvage will occur using Oregon Department of Fish and Wildlife (ODFW)- and NOAA Fisheries-approved methods. Following fish removal, double sandbag dams lined with plastic will be placed upstream and downstream of the bridges and culvert to isolate the work area from the flowing water.

The flow in Miller Creek during the in-water work period is expected to be minimal or non-existent. The sand bag dam upstream of the work area will likely impound the creek's flow for the duration of the work period. For Sidney Ditch and Chehulpum Creek, a gravity flow diversion pipe will be used to bypass water below the work area during construction. There may be some temporary pumping with pump systems that include screens that meet NOAA Fisheries' guidelines to exclude juvenile salmonid entry. Flow below the work area will be maintained and at no point during the construction process will de-watering occur below the project site.

Work area isolation, dewatering, and fish salvage activities will be monitored by trained and experienced biologist(s) who will also be on site when the stream channel is rewatered. Monitoring of the pump system and the gravity-fed system will be accomplished by the contractor.

1.2.5 South Jefferson Interchange Construction

The South Jefferson Interchange (Exit 238) is substandard and will be rebuilt as a part of this project. Proposed improvements include replacing the existing southbound I-5 bridge that spans the Jefferson Highway at the interchange, extending an existing retaining wall, replacing the existing southbound off-ramp, slightly realigning Highway 164 under the interchange bridges, and drainage improvements. The impacts to ESA-listed species will be primarily due to impervious surface and stormwater treatment.

Proposed interchange improvements will include a new southbound off-ramp. The proposed off-ramp will use portions of the existing ramp's alignment and will be designed so that stormwater sheet-flows to adjacent pervious terrain.

The new off-ramp will require a culvert where the road crosses a small ditch that drains from a seasonal wetland located on the eastside of the freeway. The proposed culvert will be a 2.4-m wide by 1.8-m tall open-bottomed box culvert and will be similar to two existing culverts upstream. The proposed culvert will be approximately 16 m in length with nearly zero slope. A new drainage ditch will be constructed downstream of the proposed culvert as part of proposed interchange improvements. The proposed ditch will be a 3-m wide trapezoidal channel with 5:1 vertical to horizontal side slopes on its left side and 2:1 vertical to horizontal side slopes on its right side.

The proposed realignment of the existing southbound off-ramp at the South Jefferson Interchange will require placement of a maximum of 1,000 m^3 of fill into and beside the southeast margin of a pond located next to the existing off-ramp that has no hydrologic connection to waterbodies that contain listed fish species.

2. ENDANGERED SPECIES ACT

2.1 Biological Opinion

2.1.1 Biological Information

The action area is defined by NOAA Fisheries regulations (50 CFR 402) as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The action area for this project is the project limits (I-5 southbound MP 234.74 to 244.69) and a 100-m buffer around the project footprint which includes 100 m outside of the project footprint on streams and ditches that have ESA-listed fish. The action area also includes a 200-m section of the Sidney Power Ditch (Sidney Ditch), Miller Creek and Chehulpum Creek 100 m downstream of in-water work areas.

UWR winter steelhead and UWR chinook salmon migrate through, spawn, and rear in the Willamette and Santiam Rivers. Details specific to each of the two evolutionarily significant units (ESUs) follow.

UWR Chinook Salmon

The UWR chinook salmon ESU includes native spring-run populations above Willamette Falls and in the Clackamas River. In the past, it included sizable numbers of spawning salmon in the Santiam River, the middle fork of the Willamette River, and the McKenzie River, as well as smaller numbers in the Molalla River, Calapooia River, and Abiqua Creek.

The total run sizes reported for UWR spring chinook since 1970 have ranged from 30,000 to 130,000, with the 2000-2002 runs in the range of 60,000 to 80,000. In 2002, fishery counts showed a rate of 77 % for marked fish through June. Hence, approximately 23% of the 2002 forecasted run size of 74,000 results in approximately 17,000 natural spawners in the Willamette basin (ODFW 2002).

Fish in this ESU are distinct from those of adjacent ESUs in life history and marine distribution. The life history of chinook salmon in the UWR ESU includes traits from both ocean- and stream-type development strategies. Coded wire tag (CWT) recoveries indicate that the fish travel to the marine waters off British Columbia and Alaska. More Willamette fish are recovered in Alaskan waters than fish from the Lower Columbia River ESU. UWR chinook salmon mature in their fourth or fifth years. Historically, 5-year-old fish dominated the spawning migration runs, but recently, most fish have matured at age 4. The timing of the spawning migration is limited by Willamette Falls. High flows in the spring allow access to the upper Willamette basin, whereas low flows in the summer and autumn prevent later-migrating fish from ascending the falls. The low flows may serve as an isolating mechanism, separating this ESU from others nearby.

Human activities have had vast effects on the salmonid populations in the Willamette River drainage. First, the Willamette River, once a highly braided river system, has been dramatically simplified through channelization, dredging, and other activities that have reduced rearing habitat by as much as 75%. In addition, the construction of 37 dams in the basin has blocked access to over 700 km of stream and river spawning habitat. The dams also alter the temperature regime of the Willamette and its tributaries, affecting the timing and development of naturally-spawned eggs and fry. Water quality is also affected by development and other economic activities. Agricultural and urban land uses on the valley floor, as well as timber harvesting in the Cascade and Coast ranges, contribute to increased erosion and sediment load in Willamette River Basin streams and rivers. Finally, since at least the 1920s, the lower Willamette River has suffered municipal and industrial pollution.

Hatchery production in the basin began in the late nineteenth century. Eggs were transported throughout the basin, resulting in current populations that are relatively homogeneous genetically, although still distinct from those of surrounding ESUs. Hatchery production continues in the Willamette River, with an average of 8.4 million smolts and fingerlings released each year into the main river or its tributaries between 1975 and 1994. Hatcheries are currently responsible for most production (90% of escapement) in the basin.

Harvest on this ESU is high, both in the ocean and in river. The total in river harvest below the falls from 1991 through 1995 averaged 33%, and was much higher before then. Ocean harvest was estimated as between 19-33% since 1982.

Spring chinook salmon are native to the Santiam River subbasin. Wallis (1963) estimated a minimum run size of 8,250 adults in 1934 based on egg-taking at a hatchery rack near the confluence of the Breitenbush and North Santiam rivers (now under Detroit reservoir). This estimate did not include fish that spawned downstream of the rack, such as in the lower mainstem North Santiam River and the Little North Santiam River. Mattson (1948) estimated that in 1947, 2,015 fish spawned naturally in the areas that are now above Detroit and Big Cliff dams out of an estimated 2,830 in the North Santiam River subbasin as a whole. Parkhurst *et al.* (1950) estimated that habitat could accommodate at least 30,000 adults.

Because hatchery fish were not consistently marked prior to 1998, it was not possible to detect trends in the wild, or naturally-produced population. For wild spring chinook salmon still present in the North Santiam subbasin, implementation of an expanded, basin-wide hatchery marking program and an increasingly selective fishery are expected to result in an incremental increase in survival of 37%. ODFW has begun to determine the extent of remnant wild spring chinook salmon population in the North Santiam subbasin, through the collection of otoliths and scale samples from adults caught in the sport fishery, on the spawning grounds, and at the Minto facility (ODFW 1998). Beginning in 2001, ODFW also monitored the ratios of marked to unmarked adult spring chinook salmon at Stayton, in the fishery, on the spawning grounds, and at the Minto facility.

While examination of the status of wild spring chinook continues, all hatchery spring chinook released in the North Santiam River are marked smolts. ODFW plans to maintain the practice of not stocking the Little North Santiam River, but the Willamette Basin Fish Management Plan (ODFW 1998) requires that, if wild spring chinook escapement (which has declined in recent years) does not improve, a “rehabilitation” program (stocking with marked hatchery smolts) be considered for one cycle.

<u>UWR Steelhead</u>
The UWR steelhead ESU occupies the Willamette River and tributaries upstream of Willamette Falls, extending to and including the Calapooia River. These major river basins containing spawning and rearing habitat comprise more than 12,000 km^2 in Oregon. Rivers that contain naturally-spawning, winter-run steelhead include the Tualatin, Molalla, Santiam, Calapooia, Yamhill, Rickreall, Luckiamute, and Mary’s Rivers. Early migrating winter and summer

steelhead have been introduced into the upper Willamette basin, but those components are not part of the ESU. Native winter steelhead within this ESU have been declining since 1971, and have exhibited large fluctuations in abundance.

In general, native steelhead of the upper Willamette basin are late-migrating winter steelhead, entering freshwater primarily in March and April. This atypical run timing appears to be an adaptation for ascending Willamette Falls, which functions as an isolating mechanism for UWR steelhead. Reproductive isolation resulting from the falls may explain the genetic distinction between steelhead from the upper Willamette basin and those in the lower river. UWR late-migrating steelhead are ocean-maturing fish. Most return at age 4, with a small proportion returning as 5-year-olds (Busby *et al.* 1996).

Willamette Falls (river kilometer 77) is a known migration barrier. Winter steelhead and spring chinook salmon historically occurred above the falls, whereas summer steelhead, fall chinook, and coho salmon did not. Detroit and Big Cliff Dams cut off 540 km of spawning and rearing habitat in the North Santiam River. In general, habitat in this ESU has become substantially simplified since the 1800s by removal of large woody debris to increase the river's navigability.

The main hatchery production of native (late-run) winter steelhead occurs in the North Fork Santiam River, where estimates of hatchery proportion in natural spawning areas range from 14% to 54% (Busby *et al.* 1996). More recent estimates of the percentage of naturally-spawning fish attributable to hatcheries in the late 1990s are 17% in the North Santiam, and 5-12% in the South Santiam (Chilcote 1997).

Based on an August 1940 survey, Parkhurst *et al.* (1950) stated that conditions in the mainstem Santiam River (the reach below the confluence of the North with the South Santiam) were not suitable for spawning by salmon or trout.

Thompson *et al.* (1966) estimated that the North Santiam subbasin supported a population of 3,500 UWR steelhead in the 1950s and 1960s, including adults trapped at Minto Dam. Currently, UWR steelhead spawn in the mainstem of the North Santiam River below Minto Dam and in tributaries such as the Little North Santiam River, Mad Creek, and Rock Creek. Tributaries to the upper Little North Santiam River such as Elkhorn Creek and Sinker Creek are also used extensively. Because spawning takes place primarily in May, it is separated in time from that of UWR chinook salmon which takes place primarily in September. Some spatial separation occurs as well because UWR steelhead typically spawn in smaller streams than UWR chinook salmon but there is considerable overlap in larger streams, such as the mainstem North Santiam and the Little North Santiam River.

Before dam construction, some steelhead reached the upper stretches of the Santiam system as early the last of March and as late as the first of May. Spawning usually took place between April and the first of June (Dimmick and Merryfield 1945). ODFW currently uses February 15th to discriminate nonnative (Big Creek Hatchery) from native winter steelhead at Willamette Falls

(Kostow 1995). Spawning takes place from April through the first of June, indicating little change from historical conditions.

A winter-run hatchery stock, developed primarily from North Santiam wild fish but with some fish from the Big Creek and Klaskanine River stocks, was released into the Santiam subbasin beginning in 1952. ODFW (1990) releases approximately 100,000 steelhead smolts each year, mostly into the mainstem North Santiam River and Big Cliff Reservoir. Traps installed at Stayton in the North Santiam River in 1993 and 1994 caught 42% and 85%, respectively, marked winter steelhead (Kostow 1995). Hatchery strays from outside the system represented 2% of the catch in both years; the remainder were North Santiam stock hatchery fish. Beginning with releases in 1990, 100% were marked.

2.1.2 Evaluating Proposed Actions

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA as defined by 50 CFR Part 402. NOAA Fisheries must determine whether the action is likely to jeopardize the listed species and/or whether the action is likely to destroy or adversely modify critical habitat. This analysis involves the initial steps of: (1) Defining the biological requirements and current status of the listed species; and (2) evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NOAA Fisheries evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NOAA Fisheries must consider the estimated level of mortality attributable to: (1) Collective effects of the proposed or continuing action; (2) the environmental baseline; and (3) any cumulative effects. If NOAA Fisheries finds that the action is likely to jeopardize the listed species, NOAA Fisheries must identify reasonable and prudent alternatives for the action.

For the proposed action, NOAA Fisheries' jeopardy analysis considers direct or indirect mortality of fish attributable to the action. NOAA Fisheries' analysis considers the extent to which the proposed action impairs the function of essential elements necessary for migration, spawning, and rearing of UWR chinook salmon and UWR steelhead under the existing environmental baseline.

2.1.3 Biological Requirements

The first step in the methods NOAA Fisheries uses for applying the ESA section 7(a)(2) to listed salmonids is to define the species' biological requirements that are most relevant to each consultation. NOAA Fisheries also considers the current status of the listed species, taking into account population size, trends, distribution and genetic diversity. To assess the current status of the listed species, NOAA Fisheries starts with the determinations made in its decision to list the species for ESA protection and also considers new data available that is relevant to the determination.

The relevant biological requirements are those necessary for the listed species to survive and recover to a naturally-reproducing population level, at which time protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance its capacity to adapt to various environmental conditions, and allow it to become self-sustaining in the natural environment.

Essential habitat features for salmonids are: Substrate, water quality, water quantity, water temperature, water velocity, cover/shelter, food (juvenile only), riparian vegetation, space, and safe passage conditions. The proposed action may affect the essential habitat features of water quality, riparian vegetation and substrate. The Willamette River within the action area serves as a migration and rearing area for UWR chinook salmon and UWR steelhead. The Santiam River within the action area serves as a migration, rearing and spawning area for UWR chinook salmon and UWR steelhead.

For this consultation, the biological requirements are improved habitat characteristics that function to support successful rearing and migration. The current status of the listed species, based upon their risk of extinction, has not significantly improved since the species were listed.

2.1.4 Environmental Baseline

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species or its habitat and ecosystem within the action area. Direct effects occur at the project site and may extend upstream or downstream based on the potential for impairing fish passage, hydraulics, sediment and pollutant discharge, and the extent of riparian habitat modifications. Indirect effects may occur throughout the watershed where actions described in this Opinion lead to additional activities or affect ecological functions, contributing to habitat degradation. For this consultation, the action area is defined by NOAA Fisheries regulations (50 CFR 402) as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.” The action area for this project is the project limits (I-5 southbound MP 234.74 to 244.69) and a 100-m buffer around the project footprint which includes 100 m outside of the project footprint on streams and ditches that have ESA-listed fish. The action area also includes a 200-m section of the Sidney Power Ditch (Sidney Ditch), and Miller and Chehulpum Creeks 100m downstream of in-water work areas.

<u>Willamette River Watershed</u>
The Willamette River watershed covers a vast area (29,785 km^2) bordered on the east and west by the Cascades and the Pacific coast ranges. It drains from as far south as Cottage Grove and flows north to its confluence with the Columbia River. The Willamette River watershed is the largest river basin in Oregon. Elevations in the basin range from over 3,048 m in the Cascade Range to less than 3 m at the confluence with the Columbia River. It is home to most of the state’s population, its largest cities, and many major industries. The watershed also contains some of Oregon’s most productive agricultural lands and supports important fishery resources (City of Portland 2001).

The uplands (Coast and Cascade Ranges) receive about 80% of the precipitation falling on the Willamette River basin, and store much of this water as snow. Ecosystem productivity in these upland streams is relatively low, with aquatic insects gleaning much of their diet from material that falls into running water. In larger, slower tributaries, more plant material is produced in the stream itself. The mainstem supports a highly productive algal community that blooms as temperatures rise in the summer. Insects and some vertebrates feed on these plants, and many vertebrates, including salmonids, feed on stream-dwelling insects. Much of the habitat for Willamette River salmonids has been degraded by various land use practices or eliminated by dams. Wild salmonid populations have declined precipitously over the last century in the Willamette River (WRI 1999).

Significant changes have occurred in the watershed since the arrival of Europeans in the 1800s. The watershed was mostly forested land before the arrival of white settlers. Now, about half the basin is still forested. One-third of the basin is used for agriculture, and about 5% is urbanized or is in residential use. The river receives direct inputs from treated municipal wastes and industrial effluents. Nonpoint source input from agricultural, silvicultural, residential, urban and industrial land uses are also significant, especially during rainfall runoff.

The upper Willamette River, inclusive of the project site, is not currently listed on the Oregon Department of Environmental Quality (ODEQ) 303(d) List of Water Quality Limited Water Bodies, however, many of the tributaries are listed for various parameters including mercury, lead, E. coli, arsenic, dichloroethylenes, temperature, turbidity and dissolved oxygen (ODEQ 2002).

<u>Santiam River Watershed</u>
The Santiam River is a major tributary of the Willamette River encompassing an area of approximately 4,732 km^2 (ODFW 1992). Approximately 40% of the Santiam watershed is public land, of which 34% is managed by the U.S. Forest Service (ODFW 1992). The basin originates in the Cascade Mountains and the river flows west approximately 167 km to its confluence with the Willamette River (ODFW 1992). The Santiam River has two main tributaries, the North Santiam River and South Santiam River. The two rivers join to form the Santiam River approximately 19 km (12 mi) upstream of the Santiam River's confluence with the Willamette River.

The Santiam watershed passes through two physiographic regions: the Western Cascades, and the Willamette Valley. The Western Cascades consists of deeply dissected volcanic mountains that rise abruptly from the Willamette Valley. The westernmost portion of the Santiam River watershed is the Willamette Valley region, a low, gently sloping bottomland with terraces formed from alluvial plains. This is also the most densely populated region of the watershed.

The U.S. Army Corps of Engineers' (COE) Big Cliff and Detroit dams upstream on the North Santiam block passage to 61.1 km of habitat and passage to tributaries. The Minto fish weir, located 3.2 km below Big Cliff Dam also restricts upstream passage. Downstream from the Big Cliff Dam, the North Santiam has 75.6 km of potential fish habitat. At the Minto facility, ODFW sorts marked hatchery fish from wild fish, and returns some of the hatchery fish to sites downstream for the recreational fisheries. Unmarked fish are returned to the river, either immediately above the weir, or in some cases into the Little North Santiam, the largest tributary below the COE dams.

Prior to construction of Detroit and Big Cliff Dams, peak flows in the North Santiam greater than 40,000 cfs were not uncommon. Since completion of the existing COE flood control projects, unregulated inflows from tributaries such as the Little North Santiam River continue to produce flood events comparable to all but the largest pre-dam flows.

The North Santiam River is 303d-listed for temperature in both time periods checked by Oregon Department of Environmental Quality (ODEQ 2002). Their data showed that 39% of summer values exceeded the temperature standard (17.8°C), with exceedences annually and a maximum of 22°C in water years 1986-1995. For the spawning season criteria of 12.8°C, 12 days in the period of September, 1999 to June, 2000, had temperatures exceeding the criteria (ODEQ 2002). In draft guidance for temperature water quality standards, the EPA listed adult migration lethal temperatures as 21-22°C for 1 week constant exposure, with elevated disease at constant temperatures 14-17°C, and an overall reduction in migration fitness due to cumulative stresses found at temperatures greater than 17-18°C for prolonged exposures (EPA 2002). Spawning and egg incubation temperatures were much lower with constant 4-12°C necessary for good survival.

Dams and diversions have altered the natural flow pattern of the Santiam River. Water withdrawals, roads, and changes in vegetation have altered the watershed's hydrology at a landscape scale. Five large dams have been constructed in the Santiam River watershed. Three of these dams are located on the South Santiam River. Willamette Industries maintains one of these structures, which functions as a log pond. The COE maintains the other two dams within the South Santiam River watershed, Foster Dam and Green Peter Dam. Both of the structures form large reservoirs. The COE also maintains two dams on the North Santiam River, Big Cliff Dam and Detroit Dam.

The Santiam River, from its mouth to the confluence of the North and Santiam Rivers is currently listed on the Oregon Department of Environmental Quality (ODEQ) 303(d) List of Water Quality Limited Water Bodies for temperature (ODEQ 2002). The South Santiam River below McDowell Creek, approximately 6.4 km northwest of the town of Sweet Home, is currently listed on the ODEQ 303(d) List for temperature and bacteria exceedences (ODEQ 2002). The ODFW defined in-water work period the Santiam River is June 1 to September 30 (ODFW 2000).

<u>Middle Willamette River Tributaries</u>
The middle Willamette River tributaries within the action area flow generally east to west and are intersected by the project site upstream of their confluence with the Willamette River. These creeks drain relatively small areas that are bounded by small basalt hills common in the central Willamette Valley. The topography of these watersheds consists of low slopes, reflective of many low gradient streams in the Willamette Valley bottom.

The middle Willamette River tributaries in the southern part of the project area pass through heavily industrialized land and salmonid habitat has been degraded with development. The channels and riparian areas of these creeks have been heavily modified by development and agricultural activities. Much of the land has been converted to farmland and the fields have been tiled, channelizing natural drainage ways to enable more efficient runoff. The proposed project does not involve work in or near any of these creeks.

Middle Willamette River tributaries in the northern part of the project corridor (Chehulpum Creek, Crooks Creek, Sidney Ditch, and Miller Creek) have better fish habitat, however, are still affected by agriculture and road crossings. Chehulpum Creek and Miller Creek are hydrologically connected to Sidney Ditch, therefore their natural flow regime has been modified from historic conditions. The proposed project involves work within Chehulpum Creek, Miller Creek, and Sidney Ditch, which do have ESA-listed fish species present.

The Ankeny National Wildlife Refuge abuts the western edge of the action area near the confluence of the Willamette and Santiam Rivers and contains portions of Sidney Ditch, Miller Creek, and Bashaw Creek. The refuge is approximately 1,133 ha and consists of flat or gently rolling terrain. The refuge's main purpose is to provide wintering habitat for migratory waterfowl. The refuge is outside of the action area and therefore will not be affected by the proposed project.

2.1.5 Analysis of Effects

Creeks and rivers are dynamic systems that naturally alter their courses in response to many physical processes. Roadways and other structures constructed along waterways are subject to flooding and undercutting as a result of these natural changes in the stream course. Structural hardening of embankments is the traditional means of protecting these structures along waterways. Hardened embankments simplify stream channels, alter hydraulic processes, and prevent natural channel adjustments (Spence *et al.* 1996). Moreover, embankment hardening may shift the erosion point either upstream or downstream of the project and accelerate stream velocity. As amplified erosive forces attack different locations and landowners respond with more bank hardening, the river eventually attains a continuous fixed alignment lacking habitat complexity (COE 1977).

The temporary bridges will enable work to be done outside of the channel. These bridges will fully span the channels and not consist of treated materials. Piles will be driven, however, they will be outside of the channels and in the dry. Due to equipment operation there is potential for chemical contamination.

Fish habitats are enhanced by diversity of habitats at the land-water interface and adjacent bank (COE 1977). Streamside vegetation provides shade that reduces water temperature and stabilizes streambanks. Overhanging branches provide cover from predators. Insects and other invertebrates that fall from overhanging branches may be preyed upon by fish, or provide food sources for other prey organisms. Immersed vegetation, logs, and root wads provide points of attachment for aquatic prey organisms, shelter from swift currents during high flows, retain bed load sediment, create pools, and reduce flow velocity.

The combination of channel confinement within the existing bridge abutments and the legacy of large woody material removal within the system and specifically at roadway crossings has simplified the habitat within the action area and retarded the formation and maintenance of complex fish habitat within the project reach. By fully spanning and creating larger hydraulic openings under the bridges, habitat can become more complex within the action area.

<u>Sediment</u>
The driving of the temporary pile bridge piers may temporarily increase releases of sediment. Transportation of sediments into the Willamette and Santiam Rivers from upland construction activities is also possible. Upland excavation will expose and dislodge soils, increasing erosion and stream turbidity during rainfall. An increase in turbidity from suspension of fine sediments can adversely affect fish and filter-feeding macro-invertebrates downstream of the work site. At moderate levels, turbidity has the potential to reduce primary and secondary productivity; at higher levels, turbidity may interfere with feeding and may injure and even kill both juvenile and adult fish (Spence *et al.* 1996, Berg and Northcote 1985).

Suspended sediment and turbidity influences on fish reported in the literature range from beneficial to detrimental. Elevated total suspended solids (TSS) conditions have been reported to enhance cover conditions, reduce piscivorus fish/bird predation rates, and improve survival. Elevated TSS conditions have also been reported to cause physiological stress, reduce growth, and adversely affect survival. Of key importance in considering the detrimental effects of TSS on fish are the frequency and the duration of the exposure, not just the TSS concentration.

Behavioral avoidance of turbid waters may be one of the most important effects of suspended sediments (DeVore *et al.* 1980, Birtwell *et al.* 1984, Scannell 1988). Salmonids have been observed to move laterally and downstream to avoid turbid plumes (McLeay *et al.* 1984, 1987, Sigler *et al.* 1984, Lloyd 1987, Scannell 1988, Servizi and Martens 1991). Juvenile salmonids tend to avoid streams that are chronically turbid, such as glacial streams or those disturbed by human activities, unless the fish need to traverse these streams along migration routes (Lloyd *et al.* 1987). In addition, a potentially positive reported effect is providing refuge and cover from predation (Gregory and Levings 1988).

Fish that remain in turbid, or elevated TSS, waters experience a reduction in predation from piscivorus fish and birds (Gregory and Levings 1998). In systems with intense predation pressure, this provides a beneficial trade off (*e.g.*, enhanced survival) to the cost of potential physical effects (*e.g.*, reduced growth). Turbidity levels of about 23 Nephalometric Turbidity Units (NTU) have been found to minimize bird and fish predation risks (Gregory 1993). Exposure duration is a critical determinant of the occurrence and importance of physical or behavioral effects (Newcombe and MacDonald 1991). Salmonids have evolved in systems that periodically experience short-term pulses (days to weeks) of high suspended sediment loads, often associated with flood events, and are adapted to such high pulse exposures. Adult and larger juvenile salmonids may be little affected by the high concentrations of suspended sediments that occur during storm and snowmelt runoff episodes (Bjornn and Reiser 1991). However, research shows that chronic exposure can cause physiological stress responses that can increase maintenance energy and reduce feeding and growth (Redding *et al.* 1987, Lloyd 1987, Servizi and Martens 1991).

Turbidity, at moderate levels, has the potential to adversely affect primary and secondary productivity, and at high levels, has the potential to injure and kill adult and juvenile fish, and may also interfere with feeding (Spence *et al.* 1996). Newly-emerged salmonid fry may be vulnerable to even moderate amounts of turbidity (Bjornn and Reiser 1991). Other behavioral effects on fish, such as gill-flaring and feeding changes, have been observed in response to pulses of suspended sediment (Berg and Northcote 1985). Fine, redeposited sediments also have the potential to adversely affect primary and secondary productivity (Spence *et al.* 1996), and to reduce incubation success (Bell 1991) and cover for juvenile salmonids (Bjornn and Reiser 1991).

To minimize the potential for increased turbidity and disturbance of fish, the in-water work will occur during the preferred in-water work period. During this window, streamflows are typically low or nonexistent, fish presence is reduced, and rainfall is minimal. Erosion and sediment control devices will be deployed within 90 m of the stream and will stay in place until the project area is stabilized.

Stream Channel Conditions

Channel conditions and dynamics are influenced by a number of processes. Changes in bank structure from the addition of hard structures such as riprap and the proposed gabions may directly affect channel condition and dynamics. Hard structures can adequately armor banklines at a single site, but simultaneously destroy or degrade other bankline features. By design, the hardening measures transfer and focus hydraulic forces to other areas. Nearshore topography is scoured, critical fish habitats can be degraded or destroyed, terrestrial habitat is lost, and erosion of neighboring property can be accelerated. Riprap is necessary to protect the bridge abutments and reduce the scour along the banks under the bridges, however, use of riprap has the potential to change salmonid migration and rearing behavior. These effects are expected to be long-term, but localized. The riprap would also potentially hinder localized water exchange processes (*i.e.*, hyporheic-surface water exchange) and floodplain connectivity within the small area underneath and immediately adjacent to the bridge. The riprap on Chehulpum Creek, and Sidney Ditch may affect stream function along the bank line and contribute to stream channelization and loss of critical stream process. Most of the riprap that will be placed will be associated with toe trench excavation. Monitoring of reaches downstream of the site to ensure that the addition of the riprap is not altering channel and bankline features should be conducted and any modifications repaired and causes rectified.

Chemical Contamination

As with all construction activities, accidental release of fuel, oil, and other contaminants may occur. Operation of the back-hoes, excavators, and other equipment requires the use of fuel, lubricants, *etc.*, which, if spilled into the channel of a waterbody or into the adjacent riparian zone, can injure or kill aquatic organisms. Petroleum-based contaminants, such as fuel, oil, and some hydraulic fluids, contain poly-cyclic aromatic hydrocarbons (PAHs), which can be acutely toxic to salmonids at high levels of exposure and can also cause chronic lethal and acute and chronic sublethal effects to aquatic organisms (Neff 1985). Similarly, exposure to herbicides can have lethal and sublethal effects on salmonids, aquatic invertebrates, aquatic vegetation, and target and non target riparian vegetation (Spence *et al.* 1996).

To minimize the potential for chemical contamination and disturbance of fish, most in-water work will occur during the preferred in-water work timing guideline of June 1 through September 30. During this window, streamflow is typically low, fish presence is reduced, and rainfall is minimal. In-water work area isolation will allow the work to occur in the dry, thereby reducing indirect introduction of chemical contaminants to actively flowing water and direct impacts to fish. Staging areas will be located in areas that have already been previously disturbed. Equipment and vehicle staging and storage will be at least 45 m from the regulated work area. Fuels and other hazardous materials will be fully contained outside of the regulated work area.

<u>Riparian Vegetation</u>.
Woody riparian vegetation provides large wood to the stream, which encourages the creation of rearing and spawning areas. Riparian vegetation also provides water quality functions (*e.g.* temperature control and nutrient transformation), bank stability, detritus (insect and leaf input, small wood for substrate for insects, *etc.*), microclimate formation, floodplain sediment retention and vegetative filtering, and recharge of the stream hyporheic zone.

The proposed project has been designed to limit ground disturbance and vegetation removal. The majority of vegetation proposed for removal is not located along waterways, therefore providing little or no riparian vegetation function for salmonids. All upland ground disturbed by the proposed project will be restored to pre-project grade and seeded and mulched. An area of approximately 102 m^2 of clearing and grubbing will be required to replace the bridges spanning Sidney Ditch and Chehulpum Creek. This constitutes the total amount of riparian vegetation affected by the proposed project.

Tree removal will be required beside the pond at the South Jefferson Interchange and along the proposed frontage road alignment. While the vegetation at these locations provides some floodplain functions, it does not provide riparian functions for any waterways. Removed trees next to the pond will remain on site to provide habitat and nutrient sources. The majority of the vegetation removed at wetland areas along the frontage road alignment and at the pond will be replaced as a result of wetland mitigation. Vegetation removal for the extension of the Miller Creek culverts will be minimized and will be mitigated by replanting permanently disturbed riparian areas at a 1.5:1 aerial replacement ratio and seeding and mulching all areas requiring grubbing and clearing according to ODOT standard specifications. Therefore, riparian mitigation will consist of planting an area of approximately 153 m^2 with native riparian species at the Sidney Ditch and Chehulpum Creek bridge locations.

Stream Hydraulics

The construction of new bridges spanning the overflow channels near the Willamette and Santiam Rivers will have little impact in terms of channel conditions and flow dynamics as they relate to salmonid habitat, however, the proposed replacement of the bridges spanning Sidney Ditch and Chehulpum Creek have the potential to affect the systems' channel condition and flow dynamics. These bridges will be fully spanning structures minimizing their effect on flow dynamics.

Direct Harm or Harassment

Bridge bent construction, removal, and culvert extensions will likely require some work area isolation from the flowing water when it is present. Fish removal activities would be in accordance with NOAA Fisheries' fish handling guidelines (NOAA Fisheries 2000). Any listed fish removed from the isolated work areas would experience high stress with the possibility of up to a 5% delayed mortality rate depending on rescue method. Work area isolation can result in a loss of aquatic invertebrates due to dewatering areas within the wetted channel. In addition, sediment-laden water created within isolated work areas could escape, resulting in impacts to the aquatic environment downstream of the project site.

2.1.6 Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as those effects of "future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Future Federal actions, including the ongoing operation of hydropower systems, hatcheries, fisheries, and land management activities are being or have been reviewed through separate section 7 consultation processes. Therefore, these actions are not considered cumulative to the proposed action.

NOAA Fisheries is not aware of any specific future non-federal activities within the action area that would cause greater impacts to listed species than presently occurs. NOAA Fisheries assumes that future private and state actions will continue at similar intensities as in recent years. This consultation covers the construction new overflow bridges, highway development and culvert extensions.

2.1.7 Conclusion

NOAA Fisheries has determined that, based on the available information, the proposed action is not likely to jeopardize the continued existence of UWR chinook salmon and UWR steelhead. NOAA Fisheries used the best available scientific and commercial data to analyze the effects of the proposed action on the biological requirements of the species relative to the environmental baseline, together with cumulative effects. NOAA Fisheries applied its evaluation methodology (NOAA Fisheries 1996) to the proposed action and found that it could cause slight degradation of anadromous salmonid habitat due to increases in sedimentation and turbidity. These effects will be temporary.

Our conclusions are based on the following considerations: (1) The proposed work will occur during the in-water work window of June 1 through September 30, which NOAA Fisheries expects will minimize the likelihood of UWR chinook salmon and UWR steelhead presence in the action area due to low flow and warm water conditions; (2) any increases in sedimentation and turbidity to the reaches of the Willamette and Santiam Rivers or their tributaries will be short-term and minor in scale, and will not change or worsen existing conditions for stream substrate in the action area; (3) ODOT will implement conservation measures that will minimize construction impacts due to construction on the site; and (4) the proposed action is not likely to impair properly functioning habitat, appreciably reduce the functioning of already impaired habitat, or retard the long-term progress of impaired habitat toward proper functioning condition essential to the long-term survival and recovery at the population or ESU scale.

2.1.8 Reinitiation of Consultation

Consultation must be reinitiated if: (1) The amount or extent of taking specified in the incidental take statement is exceeded, or is expected to be exceeded; (2) new information reveals that effects of the action may affect listed species in a way not previously considered; (3) the action is modified in a way that causes an effect on listed species that was not previously considered; or (4) a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16).

2.2 Incidental Take Statement

The ESA at section 9 [16 USC 1538] prohibits take of endangered species. The prohibition of take is extended to threatened anadromous salmonids by section 4(d) rule [50 CFR 223.203]. Take is defined by the statute as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” [16 USC 1532(19)] Harm is defined by regulation as “an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavior patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering.” [50 CFR 222.102] Harass is defined as “an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering.” [50 CFR 17.3] Incidental take is defined as “takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant.” [50 CFR 402.02] The ESA at section 7(o)(2) removes the prohibition from any incidental taking that is in compliance with the terms and conditions specified in a section 7(b)(4) incidental take statement [16 USC 1536].

An incidental take statement specifies the impact of any incidental taking of threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply to implement the reasonable and prudent measures.

2.2.1 Amount or Extent of the Take

NOAA Fisheries anticipates that the action covered by this Opinion is reasonably certain to result in incidental take of UWR chinook salmon and UWR steelhead because of detrimental effects from increased sediment levels (non-lethal), the potential for direct incidental take during the work area isolation, and delayed mortality due to handling during the fish removal process. Effects of actions such as the increased sediment levels are largely unquantifiable in the short term, and are not expected to be measurable as long-term harm to habitat features or by long-term harm to UWR chinook salmon and UWR steelhead behavior or population levels. Therefore, even though NOAA Fisheries expects some low-level incidental take to occur due to the actions covered by this Opinion, the best scientific and commercial data available are not sufficient to enable NOAA Fisheries to estimate a specific amount of incidental take to the species itself. In instances such as these, the NOAA Fisheries designates the expected level of take as "unquantifiable". Based on the information in the BA, NOAA Fisheries anticipates that an unquantifiable amount of incidental take is reasonably certain to occur as a result of the actions covered by this Opinion.

In addition, NOAA Fisheries expects that the possibility exists for handling UWR chinook salmon during the work isolation process, which will result in incidental take to individuals during the construction period. NOAA Fisheries anticipates that incidental take of up to 50 juvenile UWR chinook salmon (47 non-lethal and 3 lethal) and 50 UWR steelhead (47 non-lethal and 3 lethal) could occur as a result of the fish removal process on the North Jefferson Interchange - North Albany Interchange Southbound Road Improvement Project. The extent of the take is limited to UWR chinook salmon and UWR steelhead within the action area. The extent of the take includes the streambed, streambank and riparian corridor of the Willamette River and the Santiam River and it's tributaries. The action area for this project is the project limits (I-5 southbound MP 234.74 to 244.69) and a 100-m buffer around the project site, which also includes a 200-m section of the Sidney Power Ditch (Sidney Ditch), Miller Creek and Chehulpum Creek downstream of in-water work areas.

2.2.2 Reasonable and Prudent Measures

The measures described below are non-discretionary. They must be implemented so that they become binding conditions in order for the exemption in section 7(a)(2) to apply. The FHWA has the continuing duty to regulate the activities covered in this incidental take statement. If the FHWA fails to require the contractor to adhere to the terms and conditions of the incidental take statement through enforceable terms added to the document authorizing this action, or fails to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(a)(2) may lapse.

NOAA Fisheries believes that the following reasonable and prudent measures are necessary and appropriate to minimize take of the above species. The FHWA shall:

1. Minimize incidental take from general construction by excluding unauthorized permit actions and applying permit conditions that avoid or minimize adverse effects to riparian and aquatic systems.

2. Ensure completion of a comprehensive monitoring and reporting program to confirm this Opinion is meeting its objective of minimizing take from permitted activities

2.2.3 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, FHWA must comply with the following terms and conditions, which implement the reasonable and prudent measures described above for each category of activity.

1. To implement reasonable and prudent measure #1 (general conditions for construction, operation and maintenance), the FHWA shall ensure that:

    a. Timing of in-water work. Work within the active channel will be completed during the period of June 1 to September 30. All work must be completed by this date unless otherwise approved in writing by NOAA Fisheries.
    b. Minimum Area. Confine construction impacts to the minimum area necessary to complete the project.
    c. Cessation of work. Project operations will cease under high flow conditions that may result in inundation of the project area, except for efforts to avoid or minimize resource damage.
    d. Fish screens. All water intakes used for a project, including pumps used to isolate an in-water work area, will have a fish screen installed, operated and maintained according to NOAA Fisheries' fish screen criteria.[1]
    e. Fish passage. Passage will be provided for any adult or juvenile salmonid species present in the project area during construction, and after construction for the life of the project. Upstream passage is not required during construction if it did not previously exist.
    f. Pollution and Erosion Control Plan. A pollution and erosion control plan will be prepared and carried out to prevent pollution related to construction operations. The plan must be available for inspection on request by FHWA or NOAA Fisheries.
        i. Plan Contents. The pollution and erosion control plan must contain the pertinent elements listed below, and meet requirements of all applicable laws and regulations.

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[1] National Marine Fisheries Service, *Juvenile Fish Screen Criteria* (revised February 16, 1995) and *Addendum: Juvenile Fish Screen Criteria for Pump Intakes* (May 9, 1996) (guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm).

(1) Practices to prevent erosion and sedimentation associated with access roads, stream crossings, construction sites, borrow pit operations, haul roads, equipment and material storage sites, fueling operations and staging areas.

(2) Practices to confine, remove and dispose of excess concrete, cement and other mortars or bonding agents, including measures for washout facilities.

(3) A description of any hazardous products or materials that will be used for the project, including procedures for inventory, storage, handling, and monitoring.

(4) A spill containment and control plan with notification procedures, specific clean up and disposal instructions for different products, quick response containment and clean up measures that will be available on the site, proposed methods for disposal of spilled materials, and employee training for spill containment.

(5) Practices to prevent construction debris from dropping into any stream or waterbody, and to remove any material that does drop with a minimum disturbance to the streambed and water quality.

ii. Inspection of erosion controls. During construction, all erosion controls must be inspected daily during the rainy season and weekly during the dry season to ensure they are working adequately.[2]

(1) If inspection shows that the erosion controls are ineffective, work crews must be mobilized immediately to make repairs, install replacements, or install additional controls as necessary.

(2) Sediment must be removed from erosion controls once it has reached 1/3 of the exposed height of the control.

g. Construction discharge water. All discharge water created by construction (*e.g.*, concrete washout, pumping for work area isolation, vehicle wash water) will be treated as follows:

i. Water quality. Facilities must be designed, built and maintained to collect and treat all construction discharge water using the best available technology applicable to site conditions. The treatment must remove debris, nutrients, sediment, petroleum hydrocarbons, metals and other pollutants likely to be present.

ii. Discharge velocity. If construction discharge water is released using an outfall or diffuser port, velocities must not exceed 4 feet per second.

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[2] "Working adequately" means no turbidity plumes are evident during any part of the year.

iii. Spawning areas, marine submerged vegetation. No construction discharge water may be released within 300 feet upstream of active spawning areas or areas with marine submerged vegetation.

h. Preconstruction activity. Before significant[3] alteration of the project area, the following actions must be completed:

i. Marking. Flag the boundaries of clearing limits associated with site access and construction to prevent ground disturbance of critical riparian vegetation, wetlands and other sensitive sites beyond the flagged boundary.

ii. Emergency erosion controls. Ensure that the following materials for emergency erosion control are onsite.

(1) A supply of sediment control materials (*e.g.*, silt fence, straw bales[4]).

(2) An oil-absorbing, floating boom whenever surface water is present.

iii. Temporary erosion controls. All temporary erosion controls must be in-place and appropriately installed downslope of project activity within the riparian area until site restoration is complete.

i. Temporary access roads.

i. Existing ways. Existing roadways or travel paths must be used whenever possible, unless construction of a new way would result in less habitat take.

ii. Steep slopes. Temporary roads built mid-slope or on slopes steeper than 30% are not authorized.

iii. Minimizing soil disturbance and compaction. When a new temporary road is necessary within 150 feet[5] of a stream, waterbody or wetland, soil disturbance and compaction must be minimized by clearing vegetation to ground level and placing clean gravel over geotextile fabric, unless otherwise approved in writing by NOAA Fisheries.

iv. Temporary stream crossings.

(1) The number of temporary stream crossings must be minimized.

(2) Temporary road crossings must be designed as follows:

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[3] "Significant" means an effect can be meaningfully measured, detected or evaluated.

[4] When available, certified weed-free straw or hay bales must be used to prevent introduction of noxious weeds.

[5] Distances from a stream or waterbody are measured horizontally from, and perpendicular to, the bankfull elevation, the edge of the channel migration zone, or the edge of any associated wetland, whichever is greater. "Channel migration zone" means the area defined by the lateral extent of likely movement along a stream reach as shown by evidence of active stream channel movement over the past 100 years, e.g., alluvial fans or floodplains formed where the channel gradient decreases, the valley abruptly widens, or at the confluence of larger streams.

(a) A survey must identify and map any potential spawning habitat within 300 feet downstream of a proposed crossing.

(b) No stream crossing may occur at known or suspected spawning areas, or within 300 feet upstream of such areas if spawning areas may be affected.

(c) The crossing design must provide for foreseeable risks (*e.g.*, flooding and associated bedload and debris) to prevent the diversion of streamflow out of the channel and down the road if the crossing fails.

(d) Vehicles and machinery must cross riparian areas and streams at right angles to the main channel wherever possible.

v. Obliteration. When the project is completed, all temporary access roads and work bridges must be obliterated, the soil must be stabilized, and the site must be revegetated. Temporary roads in wet or flooded areas must be abandoned and restored as necessary by the end of the in-water work period.

j. Heavy Equipment. Use of heavy equipment will be restricted as follows:

i. Choice of equipment. When heavy equipment must be used, the equipment selected must have the least adverse effects on the environment (*e.g.*, minimally-sized, rubber-tired).

ii. Vehicle staging. Vehicles must be fueled, operated, maintained and stored as follows:

(1) Vehicle staging, cleaning, maintenance, refueling, and fuel storage must take place in a vehicle staging area placed 150 feet or more from any stream, waterbody or wetland.

(2) All vehicles operated within 150 feet of any stream, waterbody or wetland must be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected must be repaired in the vehicle staging area before the vehicle resumes operation. Inspections must be documented in a record that is available for review on request by FHWA or NOAA Fisheries.

(3) All equipment operated instream must be cleaned before beginning operations below the bankfull elevation to remove all external oil, grease, dirt, and mud.

(4) The temporary work bridges shall be constructed to ensure full containment of any spills and/or leaks.

iii. Stationary power equipment. Stationary power equipment (*e.g.*, generators, cranes) operated within 150 feet of any stream, waterbody or wetland must be diapered to prevent leaks, unless otherwise approved in writing by NOAA Fisheries.

k. <u>Site preparation</u>. Native materials will be conserved for site restoration.
   i. If possible, native materials must be left where they are found.
   ii. Materials that are moved, damaged or destroyed must be replaced with a functional equivalent during site restoration.
   iii. Any large wood,[6] native vegetation, weed-free topsoil, and native channel material displaced by construction must be stockpiled for use during site restoration.

l. <u>Isolation of in-water work area</u>. If adult or juvenile fish are reasonably certain to be present, the work area will be well isolated from the active flowing stream using inflatable bags, sandbags, sheet pilings, or similar materials. The work area will also be isolated if in-water work may occur within 300 feet upstream of spawning habitats.

m. <u>Capture and release</u>. Before and intermittently during pumping to isolate an in-water work area, an attempt must be made to capture and release fish from the isolated area using trapping, seining, electrofishing, or other methods as are prudent to minimize risk of injury.
   i. A fishery biologist experienced with work area isolation and competent to ensure the safe handling of all ESA-listed fish must conduct or supervise the entire capture and release operation.
   ii. If electrofishing equipment is used to capture fish, the capture team must comply with NOAA Fisheries' electrofishing guidelines.[7]
   iii. The capture team must handle ESA-listed fish with extreme care, keeping fish in water to the maximum extent possible during seining and transfer procedures to prevent the added stress of out-of-water handling.
   iv. Captured fish must be released as near as possible to capture sites.
   v. ESA-listed fish may not be transferred to anyone except NOAA Fisheries personnel, unless otherwise approved in writing by NOAA Fisheries.
   vi. Other Federal, state, and local permits necessary to conduct the capture and release activity must be obtained.
   vii. NOAA Fisheries or its designated representative must be allowed to accompany the capture team during the capture and release activity, and must be allowed to inspect the team's capture and release records and facilities.

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[6] For purposes of this Opinion only, "large wood" means a tree, log, or rootwad big enough to dissipate stream energy associated with high flows, capture bedload, stabilize streambanks, influence channel characteristics, and otherwise support aquatic habitat function, given the slope and bankfull width of the stream in which the wood occurs. See, Oregon Department of Forestry and Oregon Department of Fish and Wildlife, *A Guide to Placing Large Wood in Streams*, May 1995 (www.odf.state.or.us/FP/RefLibrary/LargeWoodPlacemntGuide5-95.doc).

[7] National Marine Fisheries Service, *Backpack Electrofishing Guidelines* (December 1998) (http://www.nwr.noaa.gov/1salmon/salmesa/pubs/electrog.pdf).

n. Earthwork. Earthwork (including drilling, excavation, dredging, filling and compacting) will be completed as quickly as possible.

   i. Site stabilization. All disturbed areas must be stabilized, including obliteration of temporary roads, within 12 hours of any break in work unless construction will resume work within 7 days between June 1 and September 30, or within 2 days between October 1 and May 31.

   ii. Source of materials. Boulders, rock, woody materials and other natural construction materials used for the project must be obtained outside the riparian area.

o. Site restoration. All streambanks, soils and vegetation disturbed by the project are cleaned up and restored as follows:

   i. Restoration goal. The goal of site restoration is renewal of habitat access, water quality, production of habitat elements (such as large woody debris), channel conditions, flows, watershed conditions and other ecosystem processes that form and maintain productive fish habitats.

   ii. Streambank shaping. Damaged streambanks must be restored to a natural slope, pattern and profile suitable for establishment of permanent woody vegetation.

   iii. Revegetation. Areas requiring revegetation must be replanted before the first April 15 following construction with a diverse assemblage of species that are native to the project area or region, including grasses, forbs, shrubs and trees.

   iv. Pesticides. No pesticide application is allowed, although mechanical or other methods may be used to control weeds and unwanted vegetation.

   v. Fertilizer. No surface application of fertilizer may occur within 50-feet of any stream channel.

   vi. Fencing. Fencing must be installed as necessary to prevent access to revegetated sites by livestock or unauthorized persons.

p. Treated wood.

   i. Projects using treated wood[8] that may contact flowing water or that will be placed over water where it will be exposed to mechanical abrasion or where leachate may enter flowing water are not authorized, except for pilings installed following NOAA Fisheries' guidelines.[9] Treated wood pilings must incorporate design features

[8] 'Treated wood' means lumber, pilings, and other wood products preserved with alkaline copper quaternary (ACQ), ammoniacal copper arsenate (ACA), ammoniacal copper zinc arsenate (ACZA), copper naphthenate, chromated copper arsenate (CCA), pentachlorophenol, or creosote.

[9] Letter from Steve Morris, National Marine Fisheries Service, to W.B. Paynter, Portland District, U.S. Army Corps of Engineers (December 9, 1998) (transmitting a document titled *Position Document for the Use of Treated Wood in Areas within Oregon Occupied by Endangered Species Act Proposed and Listed Anadromous Fish Species, National*

to minimize abrasion of the treated wood from vessels, floats or other objects that may cause abrasion of the piling.

ii. Projects that require removal of treated wood will use the following precautions.

(1) Treated wood debris. Take care to ensure that no treated wood debris falls into the water. If treated wood debris does fall into the water, remove it immediately.

(2) Disposal of treated wood debris. Dispose of all treated wood debris removed during a project, including treated wood pilings, at an upland facility approved for hazardous materials of this classification. Do not leave a treated wood piling in the water or stacked on the stream bank.

q. Permanent stream crossings. Permanent stream crossings will be built as follows.

i. Design.

(1) Crossing types.[10] Design road crossings in the following priority.

(a) Nothing – road realignment to avoid crossing the stream.

(b) Bridge – spanning the stream to allow for long-term dynamic channel stability.

(c) Streambed simulation – bottomless arch, embedded culvert, or ford.

(d) No-slope design culvert[11] – sometimes referred to as hydraulic design, here limited to 0% slopes.

(2) If the crossing will occur near an active spawning area, only full span bridges or streambed simulation may be used.

(3) Fill width must be limited to the minimum necessary to complete the crossing, and must not reduce existing stream width.

r. Piling removal. If a temporary or permanent piling will be removed, the following conditions apply.

i Dislodge the piling with a vibratory hammer.

ii. Once loose, place the piling onto the construction barge or other appropriate dry storage site.

Marine Fisheries Service, December 1998).

[10] For a discussion of crossing design types, see, National Marine Fisheries Service, Southwest Region, *Guidelines for Salmonid Passage at Stream Crossings* (September 2001) (http://swr.nmfs.noaa.gov/hcd/NMFSSCG.PDF) and Washington Department fo Fish and Wildlife, *Fish Passage Design at Road Culverts: A Design Manual for Fish Passage at Road Crossings* (March 3, 1999) (http://www.wa.gov/wdfw/hab/engineer/cm/toc.htm).

[11] "No-slope design culvert" means a culvert that is sufficiently large and installed flat to allow the natural movement of bedload to form a stable bed inside the culvert.

iii. If a treated wood piling breaks during removal, either remove the stump by breaking or cutting 3 feet below the sediment surface or push the stump in to that depth, then cover it with a cap of clean substrate appropriate for the site.

iv. Fill the holes left by each piling with clean, native sediments, whenever feasible.

s. Riprap placement.

i. Rock will be individually placed in a way that produces an irregularly contoured face to provide velocity disruption. No end dumping will be allowed.

ii. Any instream large wood or riparian vegetation that is moved or altered during construction will stay on site or be replaced with a functional equivalent.

iii. The bankline and riprap will be revegetated using natural vegetation (*e.g*. willow stakes).

2. To implement reasonable and prudent measure #2 (monitoring), the FHWA shall:

a. Implementation monitoring. Ensure that the permittee submits a monitoring report to the FHWA within 120 days of project completion describing the permittee's success meeting permit conditions. The monitoring report will include the following information:

i. Project identification

(1) Permittee name, permit number, and project name.

(2) Project location, including any compensatory mitigation site(s), by 5th field HUC and by latitude and longitude as determined from the appropriate USGS 7-minute quadrangle map.

(3) FHWA contact person.

(4) Starting and ending dates for work completed.

ii. Photo documentation. Photo of habitat conditions at the project and any compensation site(s), before, during, and after project completion.[12]

(1) Include general views and close-ups showing details of the project and project area, including pre and post construction.

(2) Label each photo with date, time, project name, photographer's name, and a comment about the subject.

iii. Other data. Additional project-specific data, as appropriate for individual projects.

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[12] Relevant habitat conditions may include characteristics of channels, eroding and stable streambanks in the project area, riparian vegetation, water quality, flows at base, bankfull and over-bankfull stages, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

(1) Work cessation. Dates work cessation was required due to high flows.
(2) Fish screen. Compliance with NOAA Fisheries' fish screen criteria.
(3) A summary of pollution and erosion control inspections, including any erosion control failure, hazardous material spill, and correction effort.
(4) Site preparation.
    (a) Total cleared area – riparian and upland.
    (b) Total new impervious area.
(5) Isolation of in-water work area, capture and release.
    (a) Supervisory fish biologist – name and address.
    (b) Methods of work area isolation and take minimization.
    (c) Stream conditions before, during and within one week after completion of work area isolation.
    (d) Means of fish capture.
    (e) Number of fish captured by species.
    (f) Location and condition of all fish released.
    (g) Any incidence of observed injury or mortality.
(6) Site restoration.
    (a) Finished grade slopes and elevations.
    (b) Log and rock structure elevations, orientation, and anchoring (if any).
    (c) Planting composition and density.
    (d) A five-year plan to:
        (i) Inspect and, if necessary, replace failed plantings to achieve 100% survival at the end of the first year, and 80% survival or 80% coverage after five years (including both plantings and natural recruitment).
        (ii) Control invasive non-native vegetation.
        (iii) Protect plantings from wildlife damage and other harm.

iv. Reporting. On an annual basis for 5 years after completing the project, the EPA shall ensure submital of a monitoring report to NOAA Fisheries describing the applicant's success in meeting their habitat restoration goals of any riparian plantings. This report will consist of the following information:
(1) Project identification.
    (a) Project name.
    (b) Starting and ending dates of work completed for this project.
    (c) The FHWA contact person.

(2) Riparian restoration. Documentation of the following conditions:
   (a) Any changes in planting composition and density.
   (b) A plan to inspect and, if necessary, replace failed plantings and structures.

(3) Each spring for a period of five years, the applicant shall assess the bankline downstream of the bridges to determine if stream hydrology has been altered due to riprap placement resulting in streambank slumping or erosion. Any bankline erosion or sloughing caused by altered hydrology shall be restored by the applicant using appropriate bioengineering techniques. Results of these assessments shall be included in the monitoring report described below.

v. Monitoring reports will be submitted to:
NOAA Fisheries
Oregon Habitat Branch
Attn: 2003/00839
525 NE Oregon Street, Suite 500
Portland, OR 97232-2778

b. NOTICE. If a sick, injured or dead specimen of a threatened or endangered species is found, the finder must notify the Vancouver Field Office of NOAA Fisheries Law Enforcement at 360.418.4246. The finder must take care in handling of sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder also has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed unnecessarily.

3. MAGNUSON-STEVENS ACT

3.1 Magnuson-Stevens Fishery Management and Conservation Act

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance essential fish habitat (EFH) for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (§305(b)(2)).

- NOAA Fisheries must provide conservation recommendations for any Federal or state action that would adversely affect EFH (§305(b)(4)(A)).

- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NOAA Fisheries EFH conservation recommendations, the Federal agency must explain its reasons for not following the recommendations (§305(b)(4)(B)).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting this definition of EFH: "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.10). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

EFH consultation with NOAA Fisheries is required regarding any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.

3.2 Identification of EFH

Pursuant to the MSA, the Pacific Fisheries Management Council (PFMC) has designated EFH for federally-managed fisheries within the waters of Washington, Oregon, and California. Designated EFH for groundfish and coastal pelagic species encompasses all waters from the mean high water line, and upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon and California, seaward to the boundary of the U.S. exclusive economic zone (370.4 km) (PFMC 1998a, 1998b). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other waterbodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable artificial barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (*i.e.*, natural waterfalls in existence for several hundred years) (PFMC 1999). In estuarine and marine areas, designated salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (370.4 km) offshore of Washington, Oregon, and California north of Point Conception to the Canadian border (PFMC 1999).

Detailed descriptions and identifications of EFH are contained in the fishery management plans for groundfish (PFMC 1998a), coastal pelagic species (PFMC 1998b), and Pacific salmon (PFMC 1999). Casillas *et al.* (1998) provides additional detail on the groundfish EFH habitat complexes. Assessment of the potential adverse effects to these species' EFH from the proposed action is based, in part, on these descriptions and on information provided by the FHWA.

3.3 Proposed Action

The proposed action is detailed above in section 1.2 of this document. For the purposes of this EFH consultation, the action area is defined as the project limits (I-5 southbound MP 234.74 to 244.69) and a 100-m buffer around the project footprint which includes 100 m outside of the project footprint on streams and ditches that have ESA-listed fish. The action area also includes a 200-m section of the Sidney Power Ditch (Sidney Ditch), Miller Creek and Chehulpum Creek 100m downstream of in-water work areas. This area has been designated as EFH for various life stages of chinook salmon and coho salmon.

3.4 Effects of Proposed Action

As described in detail in section 2.1.3 of this document, the proposed activities may result in short-term adverse effects to water quality (sediment, chemical contamination, riparian vegetation removal). NOAA Fisheries expects short-term adverse effects from increases in turbidity and the potential for chemical contamination within the action area. NOAA Fisheries expects long-term beneficial effects from decreased constriction and improved hydraulic conditions of the Willamette and Santiam River overflow channels as a result of the proposed bridge replacements and removal of existing impervious surface.

3.5 Conclusion

The proposed action will adversely affect the EFH for chinook and coho salmon.

3.6 EFH Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations for any Federal or state agency action that would adversely affect EFH. The conservation measures proposed for the project by the FHWA, all of the reasonable and prudent measures and the terms and conditions contained in sections 2.2.2 and 2.2.3, respectively, are applicable to salmon EFH. Therefore, NOAA Fisheries incorporates each of those measures here as EFH conservation recommendations.

3.7 Statutory Response Requirement

Please note that the MSA (section 305(b)) and 50 CFR 600.920(j) requires the Federal agency to provide a written response to NOAA Fisheries after receiving EFH conservation recommendations within 30 days of its receipt of this letter. This response must include a description of measures proposed by the agency to avoid, minimize, mitigate or offset the adverse impacts of the activity on EFH. If the response is inconsistent with a conservation recommendation from NOAA Fisheries, the agency must explain its reasons for not following the recommendation.

3.8 Supplemental Consultation

The FHWA must reinitiate EFH consultation with NOAA Fisheries if either action is substantially revised or new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920).

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